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ABSTRACT

The California Educational Technology Summit was convened to address both the existing and desired applications of technology in California education. The objectives of the summit were: to increase awareness of technology and its limits and potential; provide for a dialogue about important technology related issues across educational sectors; and produce specific recommendations for the development of a long-range plan for educational technology in California. Introductory materials include lists of the summit planning committee members, members of the California Planning Commission for Educational Technology, summit sponsors, an executive summary, and background information on the summit. Comments by panelists in three panel discussions--State of the State, State of Education, and State of the Art--are then summarized, and the 10 Technology Master Plan Topics assigned to the task groups for their review are presented. These topics are: (1) Governance and Legislative Authorization; (2) Critical Problems and the Role of Technology; (3) Access to Instructional/Learning Resources; (4) Dissemination of Information and Resources; (5) Electronic Networking; (6) Professional Development; (7) Student Learning and Technology Use; (8) Partners in Learning; (9) Administrative Uses of Technology; and (10) Evaluation and Accountability. This section, which makes up the greater part of the proceedings, includes both the initial information provided to the groups and their recommendations. A list of panel members with information on their professional backgrounds and a list of summit participants organized by task group conclude the report. A press release for the summit, a discussion of themes from the work group reports, and brief articles from EDCAL (Association of California School Administrators) and the FarWest Focus (Far West Laboratory for Educational Research and Development) are appended. (DB)

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CALIFORNIA EDUCATIONAL TECHNOLOGY SUMMIT

PROCEEDINGS

Sacramento, California
April 25 & 26, 1991

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CALIFORNIA EDUCATIONAL TECHNOLOGY SUMMIT

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Statements and findings reported in these proceedings are those of the Summit participants and no endorsement by the California Planning Commission for Educational Technology, the Summit Chair, or the Work Group Facilitators is intended or implied.

California Educational Technology Summit

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Pioneer

Regional Educational Television Advisory Council

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Executive Summary

On April 25, 1991, State Superintendent Bill Honig, Senator Becky Morgan, and Assembly Members Delaine Eastin, Sam Farr, and a representative of Assembly Member Charles Quackenbush joined business and education leaders in a two-day Summit Conference. A total of 165 teachers, professors, school administrators, and members of the business community met to develop recommendations for the educational technology master plan now being developed by the *California Planning Commission for Educational Technology*. Assembly Bill 1470, the *Farr-Morgan-Quackenbush Educational Technology Act of 1989*, established the Commission to develop a state educational technology master plan.

Summit Objectives

The Commission convened the Summit Conference to address both the existing and desired applications of technology in California education. The Summit clearly met its objectives which were to: 1) increase awareness of technology and its limits and potential, 2) provide for a dialogue about important technology related issues across educational sectors, and 3) produce specific recommendations for the Commission in the development of the long-range plan for educational technology in California. All reports from panelists and participants indicate the Summit was a success far exceeding expectations.

The Conference

The Summit began with Commission Chair Phoebe Webb, who emphasized the need to look for ideas and solutions and not just dollars for technology. John Cradler, Commissioner and Summit Chair, suggested that panelists and participants discuss and plan for technology in the context of education at large and as a vehicle for educational reform. A nationally recognized leader in educational technology, Don Ely, served as facilitator.

Following introductions and overview, three panel discussions provided background information to assist the participants in development of visions and recommendations. During the afternoon and the next morning the participants worked in groups to develop vision statements and recommendations for each of ten Technology Master Plan Topics. Resource binders containing background information, planning forms, and other printed resources on state funded programs and projects were provided for each participant.

Comments by Panelists

The three panels discussed many ideas and issues that helped to launch the working groups towards the completion of their work. Following is a brief sample of representative comments by the "state of the state" panel of legislators and the State Superintendent:

- Technology is an important resource to support the state's new, more demanding curriculum by offering interactive experiences that textbooks cannot provide and is a tool to help achieve the curriculum reform mission (Superintendent Bill Honig).
- A mission of the legislature is to bring technology into the classroom to aid teachers and make students more technologically prepared for the future (Assembly Member Sam Farr).
- The Commission plays an important role in developing a long term educational technology plan – whether or not we have the money (Senator Becky Morgan).
- We need a "Marshall Plan for education." Instead of a 2 billion dollar cut we should be making a two billion dollar additional investment in education with much of that going into technology and technology training for teachers" (Assembly Member Delaine Eastin).
- We must continue to conduct Research and Development to explore the potential benefits of technology (Ken Hargis representing Assembly Member Charles Quackenbush).

Six well-known education representatives on the "state of education" panel discussed the status of existing education technology programs and initiatives with their comments briefly represented below:

- We need to stop and carefully plan for effective integration of technology into school programs (Jim Baughman).
- Regional consortia with district commitment leverage significant local support for educational technology (Craig Blurton).
- A master plan for distance learning is needed that addresses the needs of education and of the community colleges (Ernest Leach).
- Schools need access to a variety of delivery systems including Instructional Television through broadcast, cable, and microwave systems (Thomas Mossman).
- A gateway is needed where all teachers in California can access information by voice, video, and data in any classroom (Barbara O'Connor).
- Technology cannot replace direct experience and must expand and not replace other learning resources such as books (Elizabeth Stage).

The "State of the Art" panel consisted of five leading business representatives who discussed education and technology. A sample of their representative comments as follows:

- The industry needs to find a way to make products that are acceptable to educators (Stewart Alsop).
- We need to make a paradigm shift and get outside the box – to free teachers from books and rooms – to challenge the boundaries (Jere Jacobs).
- We need flexible portable products such as compact disks and self-teaching programs (Christine Maxwell).
- You must first restructure schools and then find ways to use technology to support the restructure and the vision – adding a layer of technology doesn't work (Joe Oakey).
- We need to understand technology in the context of what it means to prepare our students for their future and not to use technology to bolster the curriculum of the past (David Thornburg).

The panelists all suggested that technology plays a critical role in education. They also suggested that planning for technology use has been overlooked and needs special emphasis in the future. They view technology as an important vehicle and a tool for expanding and restructuring education. Staff development and the development of effective software were mentioned often as critical for successful technology integration. Many panelists' suggestions gave an impetus for the Summit participants to develop visions and recommendations during the group work that followed.

Summit Recommendations

After discussing the programs and issues for education and technology each of the ten work groups developed visions and recommendations to be shared on the second day of the Summit. The highlights of their recommendations are briefly listed by work group as follows:

Governance and Legislative Authority

- Establish a market-driven statewide agency to deliver and coordinate technology resources across all educational sectors.
- Ensure that the governance structure is linked with all appropriate groups including the legislature and the governor's office.

Critical Problems and the Role of Technology

- Establish standards and mandates for school facilities to accommodate new technologies.
- Provide adequate and stable funding for technology.
- Continue to include long-range planning requirements in future legislation.
- Include educational technology in the instructional materials adoption process.
- Avoid duplication of existing resources and use them more efficiently.

Access to Instructional/Learning Resources

- Provide a statewide database of learning resources using voice, data, and video that is available to all educators and students in California.
- Establish a legislative mandate for the California Public Utilities Commission to provide special rates to education agencies for telecommunication systems.

Dissemination of Information and Resources

- Monitor the successful models and promising practices in schools and link these schools to the statewide network.
- Link together existing regional resource agencies.

Electronic Networking

- Network or link the many existing electronic communication networks together.
- Put a planning process in place to organize an educational electronic information dissemination network.

Professional Development

- Ensure that staff development is a pre-requisite to the use of technology in education.
- Provide for staff development that is needs-based, site-based, and includes follow-up.
- Develop legislation to fund regional support agencies to assist educators in using technology.

Student Learning and Technology Use

- Support school-home communications with technology.
- Provide staff development to school board members for technology use in education.
- Ensure that funding earmarked for books also be available for technology.

Partners in Learning

- Encourage business/education partnerships in the state master plan.
- Establish a state distinguished business-education program.
- Create and disseminate a resource guide on forming partnerships.

Administrative Uses of Technology

- Interconnect technology between instruction and administration.
- Use technology for timely and efficient storage and distribution of management information.
- Streamline the technology procurement process.

Evaluation and Accountability

- Evaluate technology as if it fits into the entire context of the educational process.
- Establish a statewide educational technology evaluation committee.
- Establish the State Educational Technology Evaluation Project as a resource for educators.
- Create an electronically accessible evaluation clearinghouse to share research findings.

In general the Summit recommendations from the participants emphasize technology as a means to accomplish broad educational goals. The broad goals or themes emphasized in the recommendations were increased coordination and access to learning resources, improved collaboration and communications, expansion of technology integration into the curriculum, strategic planning for technology use, provision of effective staff development, and increased access to technology that can help meet the needs of students. The facilitator made a final statement that technology should be used as a tool wherever possible to assist solutions to problems identified in all aspects of education.

Summit Proceedings

The proceedings of the Summit will be considered by the Commission along with other sources of information such as the results of the California Educational Technology Evaluation Project conducted by Far West Laboratory. The Commission welcomes input from interested educators. The California Technology Project Regional Consortia will ensure that such additional input is communicated to the Commission.

Summit Sponsors

The Summit was convened by the California Planning Commission for Educational Technology and was sponsored by organizations and businesses including Far West Laboratory, Computer-Using Educators (CUE), Monterey Peninsula Unified School District, Regis McKenna Inc., Jones Cable, Jostens, Optical Data, RETAC, Panasonic, Pioneer, GTE, ACSA, CTA, CMLEA, Apple, IBM, and others. It took the the direct and in-kind support from these entities as well as the hard work of the Summit Planning Committee to make this event a success. Already, several representatives of the sponsors have suggested another similar summit next year – perhaps to share the new master plan and introduce the next Educational Technology Legislation.

Additional Information: For information regarding the final proceedings and how to obtain a copy of the video tape of the Summit, contact John Cradler at Far West Laboratory, (415) 565-3018.

Background and Introduction

The state-wide Educational Technology Summit conference was convened by the *California Planning Commission for Educational Technology*. The Summit brought together educators, educational technology program leaders, legislators and policy makers to address both the existing and desired applications of technology in California education. The Summit was specifically conducted to: 1) increase awareness of technology and its limits and potential, 2) provide for a dialogue about important technology related issues across educational sectors, and 3) produce specific recommendations to assist the Commission in the development of the long-range plan for educational technology in California.

For the past several years there has been a rapid expansion in the use of educational technology in California schools. This expansion has taken many directions including telecommunications, distance learning, the use of computers to enhance the curriculum, interactive multimedia, instructional television, telesatellite instruction, staff development, and others. Business and industry has been promoting the educational uses of technology in a variety of ways in all education sectors. Since 1984 the state of California has invested approximately $119 million in over 30 major programs to promote the use of educational technology in the schools. The state has supported local and district technology grant programs, regional support services, materials development projects, staff development services and a variety of leadership initiatives and special projects.

Three issues emerged during the sunset of AB 803 (the previous educational technology funding act) and the development of AB 1470 (the Educational Technology Act of 1989): 1) the lack of coordinated evaluation and assessment of programs and practices for integrating technology into instruction, 2) the coordinated delivery of information and resources related to educational technology across the state, and 3) the need for a state level comprehensive long-range plan for educational technology.

Legislative Mandate for a State Plan

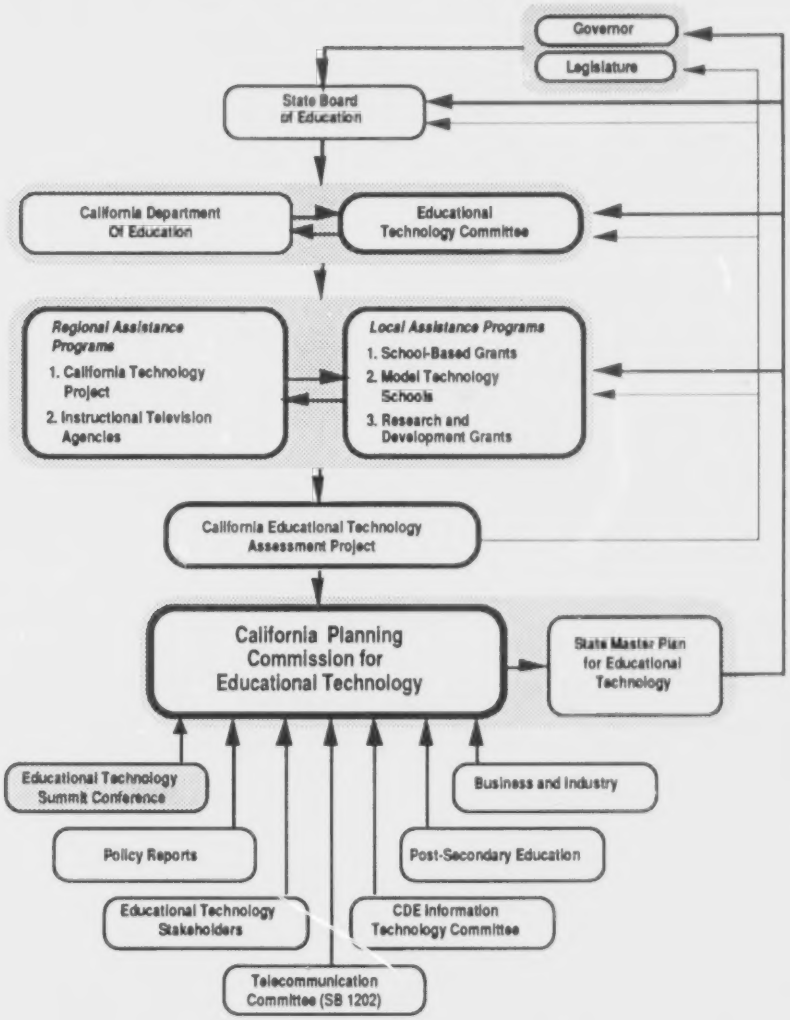
AB 1470 provides limited funding for educational technology to continue some programs such as Model Technology Schools, ITV agencies, the California Technology Project, and school-based grants for educational technology. However, this legislation sunsets on December 31, 1992 unless new legislation extends that date. AB 1470 established the *California Planning Commission for Educational Technology* to develop a long-range master plan for educational technology. This plan, along with input and plans from other committees and commissions, will serve to guide the development of a new comprehensive educational technology program for the future. The chart on the next page illustrates the relationship between the *California Planning Commission for Educational Technology* and the other components of AB 1470. Note that the Educational Technology Summit conference is <u>one of several</u> sources of information for input to the Commission.

The Need for a Summit

The Commission has found that it must have a broad base of information about the many and varied uses and delivery systems for educational technology. The Summit served to efficiently bring together needed information and to produce recommendations for input to the long-range plan for educational technology in California being developed by the Commission.

The Commission was unanimous in its decision to have a Summit that would bring together all interested groups (representing all components of the educational system, business and industry, and the legislature) to address the major issues related to educational technology in the state. They felt that the Summit should involve people who represent the various education stakeholder groups and those who represent each of the major directions in educational technology. It was also felt that the Summit would serve to increase awareness of educational technology benefits and issues for legislators and to give legislators an opportunity to provide input to the process.

The California Planning Commission for Educational Technology and the Farr-Morgan-Quackenbush Educational Technology Act of 1989 (AB 1470)



The Summit Conference

The Summit planning committee consisted of a subcommittee of the Commission and other interested parties who developed a process and agenda for the Summit. The planning committee represented the Commission, the Educational Technology Committee, Computer-Using Educators, ACSA, CTA, CMA, CPEC, CMLEA, Apple Inc., IBM, and the Far West Laboratory for Educational Research. These groups contributed resources towards the development of the Summit.

The two-day conference began with three panel discussions which served to provide background information to assist the participants in their development of positions and recommendations. The panel topics were as follows:

1. A panel of legislators including the co-authors of AB 1470 to discuss the "state of the state" in regard to funding, education, and educational technology.
2. A panel to discuss the status of existing education technology programs and initiatives.
3. A panel to discuss the current and possible future uses of technology to support education.

The participants worked in assigned groups to develop position statements and recommendations for each of Technology Master Plan Topics. The participants each received a binder containing a set of statements about the existing and desired conditions for each of the topics. The groups used this information while developing position statements and recommendations. A professional facilitator was contracted to help the groups complete their assignments.

Summit Follow-up

Written proceedings and recommendations derived from the Summit have been developed and distributed to the Commission. It has been suggested that a follow-up Summit meeting be conducted during the Spring of 1992 to report the use and impact of the recommendations on the developing state plan as well as emerging educational technology legislation.

Comments by Panelists

The Panel presentations and discussions were facilitated by Don Ely who began with comments to set the stage. He emphasized the use of a broad definition of technology and that the budget crises should not deter us from thinking ahead about planning for technology.

Panel 1: State of the State

Assembly Member Farr, a co-author of AB 1470, stated that "Today's children must be prepared for tomorrow. To make students computer literate is the mission of the legislature. We must bring technology into the classroom to free teachers to have more time, to make students more technologically prepared, to provide teaching aids, and to increase parent involvement." He believes that an important benefit of educational technology is that it provides ". . . more ways to link schools with the private sector."

Superintendent Honig commented that ". . . a more demanding, more interactive curriculum that actively engages all students is needed in California. More teacher support is needed and technology to support and supplement teachers needs to become standard in every school. More cooperation is needed with the private sector for software development. An effort must be made to figure out which parts of the curriculum are amenable to technological support." Mr. Honig also stressed the importance of upgrading the quality of teaching, stating that ". . . . more investment is needed in increasing teacher capacity to use technology." He also feels that every school must have an adequate "instructional materials and development center." He sees technology as ". . . . a tool to help achieve the curriculum reform mission." To make educational technology work in the schools we must ". . . look at structural impediments or blocks at the local level, such as lack of technicians, training, facilities, and technical support."

Senator Morgan, a co-author of AB 1470, stated that ". . . there is a need to look at (educational technology) in the long-term. We must think about whether or not we have the money to plan to meet the needs of the children. Technology is needed to turn on the TV generation in school." She sees computers not only as an aid in the classroom but also as a valuable tool in business offices to ". . . help teachers know what is needed for site-based decision making." She stated that ". . .Technology can help reach out to parents via cable TV", and expressed some concern about possible invasion of privacy with computers."

Assembly Member Eastin stated that there must be ". . . a Marshall Plan for education. Instead of a two billion cut there should be an additional two billion dollar investment in education and much of it should be going into technology and technology training for teachers." The problem of ". . . how to invite bilingual students into the learning process" must be addressed. Technology should be used to". . .help teachers to communicate" and to "make learning as fun as Nintendo." She stated that in private industry, "40% of the workers have daily access to technology." This statistic should be mirrored in the schools. Utah, a much smaller state than California, has put 21 million dollars into educational technology. "A major educational package should be proposed that will include planning for technology access. This will be a strategic fifteen year plan that will give more money to the schools so that all students and teachers will have access to technology. This will require all schools be electronically wired to support technology hardware. Today's competition is not just other states but Japan and Taiwan; there must be a long-range plan to make California competitive in the world today."

Ken Hargis, representing Assembly Member Quackenbush, a co-author of AB 1470, stated that ". . . . technology has the potential to increase efficiency in meeting student needs. Serious research and development is needed and is currently being implemented in the model schools. We must look for hard outcomes and cost-benefits." In the future, ". . . to get technology into the schools, we have to get technology language into every single new education bill."

Panel 2: State of Education

Jim Baughman, Superintendent of San Jose Unified School District stated that "We need to define where we are going–there are too many pilots. For example, in the past, technology acquisition in SJUSD was a project driven event–instead of the result of a student outcomes-based comprehensive plan. Planning must consider the diversity of student as well as staff needs. This means that flexibility must be built into the structure. The focus should be on teachers and staff first. There needs to be an integration of administrative and instructional hardware and software into the system. Today computers in the schools cannot talk to each other and this is a problem."

Craig Blurton, Director of the California Technology Project (CTP) began by stating that "the California education system is not spending, coordinating, planning or evaluating enough." He mentioned that CSUNet is one example of technology use across the state. The CTP has many benefits for example the leveraging of money from existing structures. This points to the need for the state to be more wise about the use of the available money.

There must be a Master Plan that is a state wide strategy for distance learning. State of the Art education is needed for the community colleges. There must be a state strategy to train faculty.

Tom Mossman, Director, Department of Telecommunications Services, Archdiocese of L. A., stated that . . ."the variety of avenues available to reach learners must include ITV. The seven ITV agencies obtain and deliver ITV via broadcasts - ITFS - Cable - Video Cassettes and that ITV is an important resource that is available to all schools in California."

Barbara O'Connor, Chair of the Educational Technology Committee, commented that she has observed the implementation of staff development, pilot projects, clearinghouses, etc and now feels that it is time to address the issue of interconnectiveness between schools and institutions in the state. She mentions that "There must be equity in access to serve the inner city." She commented that "equipment, training, courseware development and evaluation are needed. Quality courseware must be geared to the frameworks and reviewed by teachers. There should be a gateway where all teachers in California can access by a call voice, video, and data. Educational Technology is a tool used in the restructuring of the school system The plan for technology in the schools should be addressed at all levels."

Elizabeth Stage, Executive Director of the California Science Project, suggested that "...Educational Technology will help students and teachers be more successful in the new curriculum. However it is important to note that technology cannot replace direct experience. Technology must expand not displace teachers and books." She mentioned that the summer technology in the curriculum institutes were "..an effective method to provide lasting changes in teacher attitude and use of technology. "

Panel 3: State of the Art

Stewart Alsop, Co-Founder, Foundation for Educational Software stated that ". .. . many technology products complicate teachers' lives. We must find a way to make products that are more acceptable to educators. Educators should not accept the 'junk' that is being put on the market. Standards are needed for educational software."

Jere Jacobs of Pacific Bell stated that ". . . . a paradigm shift is needed. Teachers must get outside the box and be freed from books and rooms. We must challenge the boundaries. Policy decisions must be connected to financing. The 21st century will be a competitive world with an information-based economy. Kids need to learn how to access information."

Christine Maxwell of the Maxwell McMillan Publishing Company commented on the need for "flexible, portable products such as CD-ROM" and stated that "self-teaching language courses" could be developed with the use of technology.

Joe Oakey, a Distinguished Fellow at AutoDesk spoke of the need to create a restructuring program to facilitate the integration of technology into the schools. He stated that "Adding a layer of technology doesn't work unless you first restructure schools to use the technology to support a re-designed curriculum." He also commented that "computers should be used as tools."

Dave Thornburg, Director of the Thornburg Center for Professional Development, stated that we must ". . . . prepare for the future. Training is what allowed us to succeed in the Gulf War -- not the technology alone." He believes that California's education system has under-invested in technology since the ratio of students to computers in public schools is 28 to 1 whereas in business and industry the ratio of workers to computers is 3 to 1. He sees promise in compact easy to use products like the battery operated Bookman CD-ROM player and in interactive multimedia. He stated that the speed of telecommunication must be increased and suggested the use of fiber optics for this purpose. In closing, Thornburg commented: "The world of technology lets us explore conceptual space at the speed of thought."

Summarizing comments by Don Ely, Summit Facilitator: He summarized by stating that while a lot is going on in California with technology a lot more is needed. He added that "communication must be improved through collaborations, networks, links, and other connections." He added that "technology is a tool for teaching but due to its complexity, not a simple tool that is easily integrated into the educational system–it will take time." He mentioned that "strategic planning is important and is a needed component and that the goals of technology are not emphasized enough–we need to apply what was learned in the diffusion of innovation to the development and dissemination of technology."

Technology Master Plan Topics and Proceedings

Background

The Technology Master Plan Topics, describe the existing conditions and structures related to the application of technology across ten categories determined by AB 1470 and the Commission. A subcommittee of the Commission developed statements about the existing conditions for each of the topics. The task of the Summit participants was to review each of the descriptions with their team members and to:

- Add missing information to the existing conditions
- Develop statements about the desired condition for the use of technology
- Develop recommendations for accomplishing the desired condition.

They were instructed to make every effort to focus the attention on the topic for their team. Reviewing the statements for the other topics was suggested to help maintain focus on the assigned topic.

How the information and recommendations of the teams will be used

Recommendations have been compiled and summarized into the conference proceedings. These proceedings will be used to guide the commission in its development of the California Master Plan for Educational Technology. The Master Plan will guide the development of legislation to be introduced during the Spring of 1993. The current legislation (AB 1470) sunsets on December 31 of 1992.

Proceedings

The following pages include a draft of the proceedings of the conference. These proceedings must be reviewed by the Commission members and then distributed to Summit participants as planned. The proceedings include the initial information provided for the Summit work groups plus the responses from the task groups as indicated. Task groups were provided with: 1) legislative mandate, 2) existing conditions and structures, 3) funding information for current programs, and 4) sample issues and constraints. They were to amend these items as desired and then develop constraints, visions, and recommendations.

1.0 Governance and Legislative Authorization

1.1 Present legislative mandate/intent related to governance and legislative authorization (AB 1470)

The California Planning Commission for Educational Technology shall develop a state master plan which includes recommendations for an organizational and governance structure, or structures, that oversees or coordinates, or both, educational technology in and across various educational sectors.

1.2 Existing conditions and structures related to governance and legislative authorization

1.2.1 General Information

The following includes some of the major initiatives, programs, resources, and conditions related to governance and legislative authorization.

- The California Department of Education (CDE) makes recommendations to the Educational Technology Committee regarding funding, management, coordination, implementation, and evaluation of the AB 1470 funded programs.
- The Educational Technology Committee and the State Superintendent of Public Instruction make recommendations to the State Board of Education regarding funding and program guidelines for AB 1470 implementation.
- AB 1470 established the California Planning Commission for Educational Technology to review and analyze all existing programs and evaluation findings and to use this and other information to develop a long-range Master Plan for Educational Technology.
- Regional coordination and support for educational technology are provided by numerous agencies, including the California Technology Project, the Instructional Television Agency management and councils, county offices of education, and various school districts.
- The California Department of Education administers and evaluates the AB 1470 Programs, including the seven Instructional Television Agencies (ITV), the California Technology Project (CTP) with 14 regional consortia, the six Model Technology Schools Projects (Level I), seven subject matter specific Academic Model Technology Schools (Level II), and the School-Based Educational Technology Grants (595 schools currently funded).
- The CDE Office of Educational Technology administers other educational technology programs including business partnership projects, software development projects, software and video clearinghouses, Research and Development Grants, and the comprehensive evaluation of all educational technology projects.
- Other technology related programs such as management information systems and the Tele-Satellite (TEL-SAT) Project are administered by other offices in the CDE.
- Other governance structures that could potentially affect technology use in public schools include the SB 1202 Committee (developing a distance learning master plan), the Office of Financial Management Practices and Standards, and other state offices.

1.2.2 Funding for Current Programs and Projects

The following is a summary list of current funding sources and conditions for programs and projects that are related to governance and legislative authorization.

- AB 1470 provides approximately 14 million dollars to fund the *Farr-Morgan-Quackenbush Educational Technology Act of 1989* to be administered by the CDE.
- AB 1470 does not fund state level governance of its programs and projects.

- Funding for educational technology is now about 50% of what it was during 1987-88.
- Districts tend to use categorical funding rather than general funding for educational technology.
- Business and industry fund specific projects.

1.2.3 Issues and Constraints for the Existing Structure

Following are constraints and issues that have been cited as impediments to effective governance and legislative authorization.

- State vs. local and regional management of educational technology programs is a frequent debate.
- Equitable access to technology and information about funding resources is a problem often mentioned at the school level.
- Coordination is often lacking between governance groups and agencies and between the different agencies.
- The governance and coordination between distance learning and telecommunications systems in this state is said to be fragmented.
- Governance structures do not provide adequate coordination and communication about technology programs and resources across state agencies in such areas as curriculum, staff development, evaluation, telecommunications, etc.
- It is difficult for some to justify special and extra funding for technology during the current budget crisis.
- Funding for state level administration of educational technology is not sufficient to adequately manage and evaluate the programs for which it is responsible.
- Articulation of governance between K-12 grades and post-secondary programs is a much debated issue and a problem acknowledged by most educators.

Additional Constraints Submitted by the Summit Work Group

- Legislation for educational technology does not emphasize the coordination of resources with higher education.
- The involvement of higher education doesn't necessarily match the needs and programs of K-12 education.
- Adult education programs are frequently not coordinated with either the K-12 or community college programs and cannot make adequate use of technology hardware already in place.
- The technology requirements for a teaching credential are not necessarily coordinated with the California curriculum frameworks.
- Long-range planning is limited because the Educational Technology Committee is only in existence during the life of AB 1470.
- Because the current structure for financing educational technology programs exists through an annual allocation by the state legislature, schools have difficulty with long-range planning.
- There is no long-term commitment by the State of California to fund educational technology programs.
- Existing telecommunications/distance learning resources are either insufficient or underutilized in adult education programs.
- There is a lack of awareness and use of technology by school administrators and school board members.

1.3 Desired governance structure for educational technology

1.3.1 Vision of the desired governance structure

The ideal structure would:

- Focus on technology as a tool to effectively improve student learning and on the training of teachers in technology use;
- Remove barriers between K-12 and higher education;
- Provide for articulation among all educational segments;
- Coordinate technology resources;
- Systematically identify pre-service, administrative and instructional needs related to technology;
- Have sufficient funding and support to fully implement programs;
- Offer flexibility to accommodate change;
- Include all aspects and types of technology;
- Attend to existing and new research as a priority;
- Facilitate business partnerships;
- Involve the community at large;
- Support the effective development and implementation of coordinated short and long range plans;
- Facilitate access to varied funding sources including local, state, federal, private sector and foundation sources; and
- Consider mandates and standards for technology and funding.

1.3.2 Specific actions, resources and funding needed to implement the vision

Note: Not all members of the work group agreed with all of the following recommendations.

Educational Technology programs for California students would be coordinated and administered through the establishment of a private, independent, non-profit agency. This agency, as governed by a board of directors, would set policy and standards, disburse private and public funding and establish committees as needed.

The functions of this non-profit agency would be to stimulate innovative programs, build infrastructure capacity and to coordinate resources. This would be accomplished by:

- Establishing statewide standards for curriculum, hardware, software and instructional personnel;
- Developing vehicles for articulation among K-12, community college and higher education programs;
- Ensuring the equity of access to technology resources; and
- Promoting professional development opportunities at the pre-service and inservice levels by establishing an on-going planning process to meet the changing needs of California's educational systems.

The board of directors of this newly established non-profit agency would represent a cross-section of business and community interests, the legislature, educational agencies and educational professional organizations. The board would deliver their programs through a system of regional consortia which would also serve to identify both local and statewide needs. Both the board and the regional consortia would advocate for private and public funding of educational technology programs.

It is recommended that this agency be represented in the governor's office by a liaison to articulate the ideal applications of technological resources to strengthen education at all levels.

The long-term and on-going planning and program development roles of this agency would reflect a market-driven approach whereby there would be flexibility for change at both the state and local levels. At the state level, priorities could change as state-wide needs changed. At the local level, implementation of programs would be driven by individual school-site needs. In all cases, program development and implementation would include a strong evaluation component.

2.0 Critical Problems and the Role of Technology

2.1 Present legislative mandate/intent related to critical problems in education and use of technology (AB 1470)

The California Planning Commission for Educational Technology shall develop a state master plan which includes the identification of critical education problems, including, but not limited to, the growing number of pupils who drop out of school, increased illiteracy rates, the shortage of teachers competent with the new instructional technologies, and the disparity in educational opportunities for rural, suburban, and inner city pupils, and the role technology may play in solving these problems.

2.2 Existing critical problems related to technology

2.2.1 General Information

The following includes some of the major initiatives, programs, resources, and conditions having an effect on critical problems in education related to technology.

- Many programs designed to address the critical needs of students do not include technology.
- The California Business Roundtable, Education Summit, Legislature, and California Department of Education (CDE) have made recommendations for reform and restructuring which include school level Technology Use Plans.
- Curriculum frameworks and model curriculum standards for K-12 classrooms, which are based on educational theory and practice and set the direction for instruction, are only partially implemented and not adequately evaluated.
- The Master Plan for Higher Education (1987) provides direction for curriculum and instruction in post-secondary education.
- The CDE has established the "Every Student Succeeds" (ESS) initiative to stimulate schools to adjust programs and services to meet the needs of "at-risk" students.
- The extent to which technology supports and expands the California State Curriculum Frameworks has not been fully determined.
- The CDE is in the process of redesigning the system for assessing student performance in order to more directly relate testing programs to curriculum and authentic life experiences.
- The SB 1274 Restructuring Act authorizes funding for restructuring schools to help solve critical problems in education.

2.2.2 Funding for Current Programs and Projects

The following is a summary list of current funding sources and conditions for programs and projects that address critical problems related to technology.

- The Educational Technology Committee has recently recommended one million dollars of the AB 1470 (1991-92 budget) to be allocated for Research and Development projects to address the needs of limited and non-English speaking students.
- SB 1274 Restructuring Planning Grants may include technology in ways that will support the restructuring vision of the school.
- School districts may purchase technology to address critical problems through most available funding sources.

2.2.3 Issues and Constraints for the Existing Structure

The following are constraints and issues that have been cited as impediments for addressing critical problems related to technology.

- Student drop-out rates, illiteracy, and low performance in schools is increasing and educators are not sure how technology can address these problems.
- Rural schools have a lack of information about technological learning resources.
- The shortage of funding for education is a major crisis in California.
- K-12 and post-secondary education lacks an articulated curriculum between the two sectors.
- There is a lack of coordination of health and social services with educational programs in California.
- Often decisions about the purchase of technology are driven by the desire to have technology rather than identified critical educational problems and student needs.
- There is a lack of research showing the role of technology in solving critical educational problems.
- There is a lack of understanding of ways that technology can be used to assist "at-risk" students.
- Curriculum and instruction that sufficiently motivates students is lacking.

Additional Constraints Submitted by the Summit Work Group

- There is public apathy about education and low commitment and interest in educational excellence or change.
- There is increased population and demographics diversity in California.
- There is a lack of formative evaluation, adjustment of objectives, and reordering of priorities.
- The system for maintenance, repair and replacement of equipment and modernization of facilities and educational resources is inadequate.
- The system of governance at local, state and federal levels is cumbersome.
- There is inadequate communication and articulation between stakeholders.
- There are philosophical differences between the education system and business/industry.
- The assessment system and strategies are too diverse with no agreement about what "success" looks like.
- Testing/assessment programs are inconsistent.
- The decisionmaking system has limited involvement of teachers and students.
- There is a lack of other support personnel at school site.
- The time allotted for teachers to plan and prepare lessons is insufficient.
- There is a shortage of classroom space and a lack of comfortable and appropriate learning environments.
- Funding is not adequate or stable.
- There is a lack of technology-based materials to support the curriculum.
- Vocational education programs are antiquated.
- The textbook adoption cycle is unrealistic.
- The submission process for adoption discourages participation of technology-software developers.
- Access to good media is limited.
- Recognition of libraries and their importance in the scheme of things is needed.

- There is a lack of teacher involvement in educational technology development.
- Existing assets and resources are used inefficiently to support technology.
- There is a diverse student population and a proliferation of languages in the schools.
- Home TV counters school expectations.
- There is a lack of congruence at all levels of education.
- The decentralization of educational systems can limit equitable access to and effective use of technology.

2.3 Desired use of educational technology to resolve critical problems in education

2.3.1 Vision of the desired use of educational technology to solve critical problems

The ideal use of educational technology to resolve critical problems in education would include the following:

- Communication between home and school will improve.
- By the year 2000 student skills, knowledge and products will be assessed and recorded/tracked using technology in all schools with no boundaries between schools.
- Technology will be used to transmit student records.
- Like the real world, schools will be much more media-oriented.
- Telecommunication information centers will be established.
- ESL will be integrated through technology.
- Portable technology will be emphasized.
- Schools of education will be equipped with technology for training teachers.
- K-12 schools will be fully connected to outside information sources.
- Facilities will be customized to accommodate varied learning environments and the use of new technologies.
- Appropriate funding levels will be established for the acquisition of technology.
- Librarians will be schooled in information literacy and function as information specialists.
- Learners will be able to teach themselves using technology.
- Teachers will videotape lessons and local video collections will be available to take home.
- School planning for technology use will emphasize student and teacher needs at the classroom level.

2.3.2 Specific actions, resources and funding needed to implement the vision

Provide for adequate and stable funding to allow the master plan for educational technology to address and facilitate the following actions:

- Reduce the many constraints that interfere with the access and use of technology to address critical needs of students.
- Establish standards so that state of the art educational technologies are accessible to all newly constructed schools and retrofitted into existing schools.
- Continue to fund the implementation of the goals of AB 1470.
- Liberalize and make more flexible the educational materials adoption process to include technology.
- Utilize existing cable systems to make educational programs available to every home and school.
- Provide easy access by students and teachers to voice and data through statewide coordination of electronic networks.

- Support a national satellite for educational uses with multiple channels for pre-school to higher education students, teachers and administrators.
- Encourage the development of a statewide information delivery system that maximizes access at minimal cost without unnecessary duplication of effort.

3.0 Access to Instructional/Learning Resources

3.1 Present legislative mandate/intent related to access to instructional/learning resources (AB 1470)

The California Planning Commission for Educational Technology shall develop a state master plan which distributes the educational benefits of new technologies efficiently and equitably to all students.

3.2 Existing conditions related to access to instructional/learning resources

3.2.1 General Information

The following includes some of the major initiatives, programs, resources and conditions affecting access to instructional/learning resources.

- Student access to learning resources and technology is limited.
- Student access to learning resources often depends on access to technology through special grants.
- There are disparate technological resources across California's schools.
- Older school facilities are not designed for technology access.
- State guidelines regarding optimal learning resources and technology for students are not established.
- Knowledgeable staff to coordinate and facilitate access to technology at the school site is often lacking.
- There is frequently inefficient, uninformed selection of learning resources and limited analysis of students' learning needs when purchasing decisions are made.
- Access to learning resources and technology by teachers and students, even within the same school, is inequitable.

3.2.2 Funding for Current Programs and Projects

The following is a summary list of current funding sources and conditions for programs and projects that are related to access to instructional/learning resources.

- Funding is not specifically earmarked for access to instructional/learning resources; however, AB 1470 guidelines require a "Learning Resources Management" component in the School-Based Educational Technology Projects.
- Apple competitively awards teacher-developed, innovative projects with hardware and/or software to assist 'at risk' K-12 students.
- Proposed legislation would allow districts to purchase technology software with the designated curriculum materials fund.

3.2.3 Issues and Constraints for the Existing Structure

The following are constraints and issues that have been cited as impediments to access to instructional/learning resources.

- Disparate funding is provided to school districts for technology implementation.
- Technology use is not adequately described in state curriculum and program review guidelines and thus is often implemented in isolation from curriculum.

- Information about technology-based learning resources is often not available to schools.
- Most schools do not have coordinated systems for managing the access and distribution of learning resources related to technology.
- The state does not provide a single centralized system for coordinating and distributing information about learning resources and technology to schools.
- Regional service agencies such as county offices of education, SB 1882 staff development agencies, and the California Technology Project consortia operate with minimal inter-agency coordination.
- State guidelines, criteria, and standards for student access to technology and learning resources are lacking.
- Staff development, educational technology and curriculum should be integrated at the California Department of Education.

Additional Constraints Submitted by the Summit Work Group

- There is a lack of staff development opportunities for teachers.
- Copyright and royalty problems impede development and distribution of software.
- There is a lack of technology resources, funding, training, maintenance and time.
- Regulatory reform is needed in public telecommunicating.
- There is a lack of input from the diverse population in planning and policy making.
- Limited resources are available in languages other than English.

3.3 Desired means of access to instructional/learning resources

3.3.1 Vision of the desired means of access to instructional/learning resources

The ideal means of access to instructional/learning resources would include:

- The California Department of Education and local boards should adopt a single master plan for educational technology.
- Incentives should be provided to involve business and industry in projects consistent with the master plan.
- State-defined guidelines and funding bases should be provided to ensure equitable access to appropriate learning resources, hardware and facilities for all students including baseline-standards of minimum service/capabilities.
- An educational coalition should be formed to lobby for improvement of the telephone system.
- Pre-service teacher education programs should be included in legislative policy and funding for educational technology.
- Include the ability to use technology in credential requirements.
- Change textbook adoption process to include technology.
- Isolation of educational sectors should be eliminated – people should be encouraged to communicate together.
- Universal access should be provided through the adoption of standard technical specifications for input/output, video interface, and telecommunications.

3.3.2 Specific actions, resources and funding needed to implement the vision

In order to achieve the vision, the action plan should address the constraints as follows:

- Ensure that each school has knowledgeable library and media staff to coordinate and facilitate the integration of learning resources into the curriculum.
- Re-tool preservice and inservice training to make teachers more knowledgeable about learning resources/technology and curriculum and integration of technologies.
- Extend teacher released time for collaborative planning, partnership teaching and observing colleagues.
- Create new delivery systems to provide universal access with specific technological standardization.
- Make a statewide network capable of transmitting data, voice, and video available at all school sites.
- Put a computer on each desk, networked in each class and within the school. Laser printers, phone lines and modems, large screen monitors, and a library of laserdiscs should be available at each school for use by students and teachers.
- Create multi-lingual computer software to facilitate ESL instruction.
- Provide satellite dishes capable of uplinking and downlinking for teleconferencing and distance learning.
- Ensure that new buildings have appropriate internal wiring to support emerging technologies.
- Provide technology in the home with seamless transition between school and home learning environments.
- Encourage interactive communication with dialogues between learners and experts, peers and colleagues.
- Develop a statewide policy for maintaining equity of access to instructional/learning resources across all schools in California.
- Base all policy decisions on site/district/state/national plans.
- Provide statewide access to evaluation data on all learning resources including information on curriculum-technology matching, instructional quality, and technical quality.
- Use technology to gather data on how people use technology in order to find out who is using what and for what purpose.

4.0 Dissemination of Information and Resources

4.1 Present legislative mandate/intent related to dissemination of information and resources (AB 1470)

The California Planning Commission for Educational Technology shall develop a state master plan which proposes a method for continuously gathering and disseminating current information on all aspects of educational technology to the state's educators.

4.2 Existing conditions and structures related to dissemination of information and resources

4.2.1 General Information

The following includes major initiatives, programs, resources, and conditions related to dissemination of information and resources.

- The California Department of Education disseminates information and resources to each of its divisions and offices through the use of bulletins, memos and other documents; these are usually delivered to district and county superintendents.
- The California Department of Education has recently implemented TelSAT, a telesatellite system for providing live and taped video transmission of department initiatives and guidelines to school districts (this service was recently curtailed due to the budget crisis).
- The telephone is probably the most often used method of disseminating information to schools from the California Department of Education, the county offices of education, and other regional educational agencies.
- The existing technology clearinghouses include the Software Clearinghouse at California State University, Long Beach and the Video Clearinghouse at the Stanislaus County Office of Education. Former Teacher Education and Computer Centers (TECC) provide 17 regional locations for local access to video and software programs loaned by the clearinghouses.
- The California Technology Project (CTP) and the 14 regional consortia disseminate information and broker available resources to schools.
- California funds 7 regional Instructional Television (ITV) agencies that provide catalogues and staff development for educators. Their primary role is to assist educators in utilizing instructional television and video programs in ways that will support and expand the curriculum frameworks in the classroom.
- CSUNet - a telecommunications network maintained by the California Technology Project and the CSU System has been established by the state and is available for use by schools.
- Integration of technology into classroom curriculum is promoted through the required teacher-training technology class (AB 1681).
- Information and resource recommendations to assist schools in integrating technology into the classroom is disseminated through the county offices of education.
- Conferences sponsored by organizations such as Computer Using Educators (CUE), Association of California State Administrators (ACSA), California Teachers Association (CTA), California School Boards Association (CSBA), California Media Library Educators Association (CMLEA), the California Department of Education (CDE), as well as several sponsored by various businesses (Apple, IBM, etc.) disseminate valuable current information to educators.
- Printed materials, such as newsletters, magazines, books, and other documents are designed to inform educators about educational technology resources.

- Federally funded agencies such as Far West Laboratory for Educational Research, South West Regional Laboratories, and the National Diffusion Network Facilitator Project disseminate current information and research related to educational technology.
- Colleges and universities sometimes provide clearinghouses that distribute information related to educational technology.

4.2.2 Funding for Current Programs and Projects

The following is a summary list of current funding sources for programs and projects that conduct dissemination of information and resources.

- AB 1470 currently funds six Model Technology School sites (Level I projects) and six Academic Model Technology Schools (Level II projects) to disseminate resources and promising practices that can be funded for adoption and adaptation through AB 1470 School-Based Educational Technology Grants.
- The CTP is partially funded by AB 1470 to disseminate information about programs and practices related to educational technology and educational initiatives.

4.2.3 Issues and Constraints for the Existing Structure

The following are constraints and issues that have been cited as impediments to effective dissemination of information and resources.

- Linkage between agencies and clearinghouses is lacking.
- Educators have minimal skills in accessing technology information and resources.
- Funding for educational technology resources is frequently non-existent or severely inadequate.
- Most schools are unaware of regional resources available to them.
- Regional resources, such as the Instructional Television Agencies and the California Technology Project consortia, lack sufficient funding to adequately market and distribute their services.
- Many dissemination agencies are lacking in marketing knowledge and skills for effectively disseminating educational programs and products.
- Educators frequently find CSUNet difficult to use or do not have modems and other equipment necessary to use the system.
- The AB 1681-mandated teacher-training course frequently lacks equipment and/or software to facilitate adequate learning experiences for teacher trainees with educational technology.

Additional Constraints Submitted by the Summit Work Group

- There are problems with compatibility between hardware systems and software programs.
- Some user-friendly networks are costly while at the same time other networks cost less to use but are cumbersome for the user.
- Funding for technology is inadequate and sporadic.
- There are a multitude of agencies and companies involved in telecommunication systems and few compatibility standards.

4.3 Desired means of disseminating information and resources related to educational technology

4.3.1 Vision of the desired means of disseminating information and resources

In order for California to be the leader in educational technology there needs to be:

- A centralized state-of-the-art multimedia information database supported by regional centers and community organizations.
- A communication highway for students, educators and communities.
- Support for implementation of successful models that demonstrate effective integration of technology.
- Easy access for all schools to information on technology resources.

4.3.2 Specific actions, resources and funding needed to implement the vision.

In order to achieve the vision, the present constraints need to be resolved through the following actions:

- Coordinate existing resource agencies such as the SB 1882 regional staff development agencies, the CTP consortia, and the ITV regional agencies.
- Develop access to information for faculty and students at all levels in order to remove barriers caused by remoteness and isolation and to establish a community of scholars.
- Investigate and develop dissemination and information programs within CTP, a public funded system that could be expanded to provide extensive instructional opportunities.
- Establish reduced telephone rates for student/teacher/faculty use.
- Create and maintain a centralized state-of-the-art information base.
- Dissemination should be supported by regional centers and be accessible to all.
- Develop a systematic procedure for continuously gathering, refining and evaluating information to provide policy makers as well as local schools and districts with current information on effective practices.

5.0 Electronic Networking

5.1 Present legislative mandate/intent related to electronic networking (AB 1470)

The California Planning Commission for Educational Technology shall develop a state master plan which addresses the viability of establishing an educational network or linking existing networks to provide the state's educational community an increased capacity and efficiency in transmitting video, data and voice signals via telecommunications.

5.2 Existing conditions and structures related to electronic networking

5.2.1 General Information

The following includes some of the major initiatives, programs, resources, and conditions related to electronic networking.

- Private industry is currently using technology that integrates voice, video, and data communications.
- Telecommunication technologies (voice-mail, electronic-mail, audiotext, still-video transmission, access to informational resources) are commonplace in the business environment but lacking in educational arenas.
- Vast investments have been made in existing telecommunications networks, both public and private.
- Some universities have "stand-alone" technology systems.
- Few, if any, public and private schools have access to state-of-the-art networked telecommunications systems for instructional purposes.
- CSUNet telecommunications is available to all schools that have a computer and modem.
- Public Broadcasting Network is available to schools that can receive TV or cable broadcasts.
- Teachers and administrators lack knowledge to incorporate integrated telecommunications applications into the learning environment.
- AT&T provides *Long Distance Learning Circles* which establish partnerships among schools throughout the world for instructional purposes.
- FredMail provides a low cost telecommunications network for California teachers.
- PacBell, in conjunction with CSU and UC, funds several projects to provide electronic access to library resources within and between schools.
- A few schools use *stand-alone* systems for telecommunications (telephone networks, satellites, microwave ITFS, and cable).
- Cable TV access can be made available to most schools at little or no cost.

5.2.2 Funding for Current Programs and Projects

The following is a summary list of current funding sources and conditions for programs and projects that are related to electronic networking.

- The Educational Technology Committee has considered recommendation of funding for telecommunications projects.
- The California Technology Project funding supports training and use of the CSU maintained CSUNet.
- Most partnership projects are funded by foundations and businesses with additional support provided by schools.

5.2.3 Issues and Constraints for the Existing Structure

The following are constraints and issues that have been cited as impediments to an effective electronic network.

- There is a lack of sufficient communications facilities and/or capabilities at the school level and classroom level.
- The state lacks a coordinated strategic plan for the use of networking in schools from kindergarten through post-secondary.
- Teachers and administrators lack knowledge needed to incorporate telecommunications applications into the learning environment.
- Incompatible hardware and software systems complicate integration of existing systems.
- There are inadequate resources to explore integration and linkages between multiple technologies and public switched network facilities.
- Telecommunication technology is primarily viewed as a "frill" by educators.
- There is virtually no access to state-of-the-art networked telecommunications systems for instructional purposes.
- Funding is nonexistent for transponder time so satellite telecommunications and distance learning can be made available to schools.
- Minimal research and evaluation of the cost benefits of distance learning and networked education systems is available, especially at the K-12 level.
- Inequitable access is experienced by schools attempting to acquire equipment needed to access telecommunications networks.
- Dealing with the *re-invent the wheel* mentality is a significant barrier to concentrating critical funds where they could assist in linking existing facilities with networks.

Additional Constraints Submitted by the Summit Work Group

- An accessible state-wide user-friendly network is needed.
- The infrastructure of schools is lacking in cable connections, satellite receivers, and dedicated phone lines.
- The many disconnected "grassroots" electronic educational projects all over the state need to be coordinated.
- There is a lack of an overall plan -- various communities are proceeding with individual programs which might or might not fit into the future state plan.
- There is a serious lack of training currently available to teachers in the wide arena of educational technology and the capabilities of electronic learning.
- Funding is grossly inadequate for both equipment and staff development.
- Funding that is available is from a variety of unrelated sources -- each with its own constraints.

5.3 Desired electronic networking system for California education

5.3.1 Vision of the desired electronic networking system

The ideal electronic networking system for California would include:

- All students and teachers should have access to all appropriate information.
- The California electronic network would use technology to bring together all aspects of the educational community.

- A state-supported interactive video, voice and data communication service with broadcast capability, cable networks and satellites for transmission should be provided.
- Every California school would have a technology director working as a computer resource expert in concert with the media librarian.

5.3.2 Specific actions, resources and funding needed to implement the vision.

In order to implement the vision and eliminate the constraints, the following actions are recommended:

- Create an electronic superhighway to connect all schools.
- Create a catalogue of applications and networks for use at every school site.
- Coordinate electronic networking developments with an overall master plan for the delivery of instruction.
- Be ready to address the potential demand as soon as distance alternative education becomes available.
- Consider the potential of electronic networking for alleviating some current educational access issues as well as for creating new opportunities for expanding populations of learners.
- Make increased funding for electronic networking a legislative priority.
- Make access to the network easy, universal, convenient, and available from school, home or anywhere else.
- Network the schools into an overall system.
- Create an international directory of experts so that their classroom presentations can be transmitted to other schools.
- Provide all educators with access to all aspects of the networking system.
- Provide for portable computers with wireless modems.
- Ensure that vendors, users and educators can communicate easily.
- Provide for an electronic directory to the system which is comprehensive but easy to use.
- Provide for digital links into homes.
- Investigate the potential applications of direct broadcast satelleites and activities in video compression.
- Petition the PUC to establish a telecommunications rate for education.

6.0 Professional Development

6.1 Present legislative mandate/intent related to professional development (AB 1470)

The California Planning Commission for Educational Technology shall develop a state master plan which addresses training and information needs of schools, universities, government, businesses, and professional and community organizations; and to outline the role that technology may play in achieving previously unmet needs.

6.2 Existing conditions and structures related to professional development

6.2.1 General Information

The following includes some of the major initiatives, programs, resources, and conditions related to professional development.

- The California Technology Project (CTP) regional consortia sponsors several ongoing Teacher Leadership Academies around the state based on the specific needs of its local members as well as teleconferences on staff development for schools across the state.
- The CTP sponsors workshops and provides information to schools who wish to adopt or adapt practices of a Level I and/or a Level II Model Technology School.
- The CTP sponsors workshops on how to plan, fund, implement, and evaluate AB 1470 School Based Educational Technology Grants.
- Instructional Television (ITV) agencies provide training and information on the use of instructional television programs and instructional video to schools.
- County offices of education sponsor technology workshops in many counties for school districts.
- Some school districts, as well as some private schools, offer well-planned staff development in the use of technology for their own staff.
- Universities (both public and private), university extension divisions, community colleges, and other regional providers offer well-planned staff development programs for educators in technology use.
- There has been a significant reduction in the availability of funding and resources to provide professional development for the use of technology at the regional level.
- AB 1681 instituted pre-service technology use training for teachers at schools of education, mandating successful completion in order to receive a teaching credential.
- Workshops in technology use are offered by professional organizations, such as Computer Using Educators (CUE) and ASTUTE.
- Software and hardware vendors frequently provide training and technical assistance to school districts.
- Model Technology School (MTS Level I) projects serve as demonstration sites to showcase promising practices for other schools to adopt or adapt.
- Academic-Technology Model School (MTS Level II) projects provide regional training for the adoption and adaptation of their subject and grade-level-specific technology programs.
- Private consultants and organizations provide staff development to educators.
- Education and business partnerships, such as the Institute for Computer Technology and the San Jose Technology Center, provide in-depth training and classes for educators and students.
- Public adult schools and non-credit community college programs are served by the Outreach and Technical Assistance Network (OTAN) which brokers all types of staff development and specifically encourages integration into the instructional setting. OTAN

on-line curriculum resources, course outlines, lesson plans, public domain software, and demonstration software are available to subscribers.

6.2.2 Funding for Current Programs and Projects

The following is a summary list of current funding sources and conditions for programs and projects that provide professional development.

- SB 1882 provides over 4 million dollars for 13 regional resource consortia.
- AB 1470 provides over one million dollars to fund the California Technology Project and $2 million to support the 7 regional Instructional Television Agencies.
- AB 1470 provides funding for the 12 Level I and Level II Model Technology School projects with limited staff development.
- AB 1470 School-Based grant projects were required to spend ten percent of their budgets on staff development.
- ECIA Chapter I and II funding is sometimes allocated for staff development related to technology planning and use.
- School Improvement Program (SIP) funds can be used to fund planning and staff development for technology use.
- PL 100-297, Section 353 provides funds for staff development for adult schools and non-credit community college programs. The ESL Teacher Institute, ALIT, and OTAN are funded through this federal law. Each local agency which receives a federal grant (Section 321) must set aside a minimum of $3500 for staff development, networking (including OTAN On-Line) and assessment.

6.2.3 Issues and Constraints for the Existing Structure

The following are constraints and issues that have been cited as impediments to effective professional development.

- Staff development is frequently not focused on the needs of the teacher.
- Teachers frequently do not implement strategies or use knowledge they have acquired during staff development activities. There is a lack of accountability in follow-up activities.
- Funding for training is woefully insufficient for the increasing needs of teachers and increasing demands of students.
- Rapidly changing technology impacts university classes for teacher credentialing, teacher in-service classes, and hardware availability.
- Teachers generally have to use personal time for training in the use of technology.
- Technology is not perceived as an integrated component of core curriculum at either the pre-service or the in-service level.
- There is not a critical mass of trained teachers and students in technology use.
- Computer availability is insufficient to allow for home use by teachers.
- Teachers have little, if any, access to on-site curriculum/technology resource assistance, advice, or support.
- There are a limited number of university faculty members qualified to model new teaching methods that incorporate technology.
- The community perceives little necessity for including technology in educational instruction.
- Teaching and learning in the classroom with technology does not mirror that of the business world.
- Most staff trainers do not follow-up with additional needed site trainings due to a lack of financing.

- Existing resources that are available to provide staff development in technology are frequently not known or inaccessible to many educators and schools.
- Teachers experience a lack of access to technology to assist them during their classroom instruction preparation time.
- Model Technology School findings on staff development show that teachers need time to implement technology
- Follow-up and technical assistance must be ongoing, staff development priorities must be driven by expressed teacher needs, and staff development must emphasize integration of technology into the curriculum.

Additional Constraints Submitted by the Summit Work Group

- Prospective teachers are required to take only one course in technology which is isolated from the rest of the curriculum.
- Faculty who are doing the teacher training do not have enough background themselves to train teachers comprehensively in the use of technology.
- Many teachers don't view themselves as professionals.
- Technology programs are not developed by educators.
- There is insufficient articulation between K-12 and post-secondary teacher training and staff development.
- There is a lack of research on effective staff development for technology.
- There is a lack of integration of technology into existing staff development efforts.
- There is insufficient time for staff development.

6.3 Desired means of providing local and regional staff development

6.3.1 Vision of the desired staff development system

The ideal means of providing staff development would include:

- All teachers will have participated in meaningful professional development that directly enhances their use of technology in the classroom.
- Technology use should be incorporated into the entire teacher training curriculum.
- Training teachers should include instruction in technology-based materials use and its availability for limited English proficient children.
- Professional development planning should be a collaborative effort, site-based and focused on local needs.
- Professional development must address varying learning styles and readiness for change.
- Professional development should be the glue which binds all other elements into a successful plan.
- Professional development must be focussed on local school needs.
- Professional development requires a stable infrastructure to make it work.

6.3.2 Specific actions, resources and funding needed to implement the vision

Actions needed to implement the vision include the following:

- Encourage educators to participate in professional development throughout their careers based on individual and institutional needs.
- Require administrators to train along with teachers.

- Include educators in decision-making and governance because planning and implementation will be site-based.
- Require broad based, realistic and meaningful training for educators on the changing world of technology.
- Ensure that professional development takes place over time with consistent reinforcement, follow-up and support.
- Make business and industry partnerships available to teachers as an important staff development resource for technology use.
- Provide adequate and appropriate professional development for educators at all levels so that technology in education can be effectively implemented.
- Develop and sustain an education system that encourages risk-taking and professional growth and promotes the use of technology to address critical issues in instruction, administration and makes use of professional development to enhance student learning.
- Ensure that professional development is site-centered and needs-based, with sufficient resources dedicated to local technical support.
- Allow adequate time for planning, collaboration, skill building, and renewal.
- Provide educators at all levels with sufficient access to the appropriate equipment, personnel, and other resources needed to promote their professional development.
- Create professional development plans for individuals and teams which identify and incorporate the use of resources available within and outside of the educational community (i.e. businesses, museums, technology centers, non-profit organizations, etc.)
- Ensure that the delivery of professional development is derived from and models sound instructional practices.
- Ensure that schools and districts will have sufficient funding to support implementation of the vision.
- Encourage technology consortia to provide training to curriculum leaders and staff developers to be replicated throughout their districts.

7.0 Student Learning and Technology Use

7.1 Present legislative mandate/intent related to student learning and technology use (AB 1470)

The California Planning Commission for Educational Technology shall develop a state master plan which provides an assessment of the need for and feasibility of establishing comprehensive technology educational programs, with the goal of providing students with skills and knowledge on how to create and operate new technologies.

7.2 Existing conditions and structures related to student learning and technology use

7.2.1 General Information

The following includes some of the major initiatives, programs, resources, and conditions affecting student learning and technology use.

- Computer Aided Design (CAD) programs are currently part of the high school industrial arts curriculum in some high schools.
- The Apple *Classroom of Tomorrow* project is studying the impact of technology on student learning.
- IBM is conducting studies on the effects of the *Writing to Read* program on student learning.
- Research from the Model Technology Schools tends to show that technology is having a greater measurable impact on teaching than on student learning.
- Technology holds great potential as a tool to facilitate *authentic assessment* of student performance.
- Research and teachers report that technology can significantly improve learning while increasing opportunities for success for students with special learning needs.
- Technology can provide continuous and immediate reinforcement of student performance.
- Computers and interactive technology can provide branching lessons to maintain optimal student success rates.
- Multimedia provides non-linear access to information and can support multiple student learning modalities.

7.2.2 Funding for Current Programs and Projects

The following is a summary list of current funding sources and conditions for programs and projects promoting student learning and technology use.

- Public schools can apply for AB 1470 School-Based Educational Technology Grants that directly serve students.
- AB 1470 currently funds 6 comprehensive Model Technology School (Level I) projects that conduct in-depth research and provide demonstration of their promising practices.
- AB 1470 funds 7 regional Instructional Television (ITV) agencies to provide programming for students and to assist teachers in integrating ITV into their instructional programs.
- Districts and schools can now apply for funding, through SB 1274, that is intended to redirect resources such as technology, toward the goal of improving student learning.
- California is currently funding, through AB 1470, six curriculum and grade level specific exemplary dissemination projects (MTS Level II).

7.2.3 Issues and Constraints for the Existing Structure

The following are constraints and issues that have been cited as impediments to student learning and technology use.

- Student-appropriate technology is often perceived as 'computers only' and the multitude of additional applications of other equipment in the classroom is not well-known (such as video, multimedia, telecommunications, etc.).
- Little research exists that shows the impact of technology on student learning, thus many think that technology use is pointless.
- Since limited funding is available for classroom-based technology use, the public perception of education is frequently one of *being behind the times*.
- There is a pressing need for teacher training and use opportunities.
- There is a need for equitable access to technology for all students and teachers.
- Limited and inconsistent funding exists for implementation of technology in our schools.
- Because a lack of training and knowledge exists amongst educators, there is not a solid base of common information about technology, including simple definitions.
- Curriculum does not reflect integrated uses of technology and related learning resources.
- A well trained, confident staff and administration for technology use and assistance does not exist in most schools.
- No assessment process that reflects specific behaviors demonstrating understanding and appropriate use of technology and related learning resources exists in schools.
- Partnerships with home and business/industry that guide and reinforce the application of technology and related learning resources do not exist.
- No common standards, visions or goals in educational technology exist at the state level, nor is there a solid funding base for their existence.
- California ranks in the bottom 10th percentile in terms of the number of computers per student.
- Much educational software is not validated in terms of supporting curriculum frameworks.
- Much educational software does not take advantage of the power and interactive capability of technology.
- Teachers lack information and skill on how to effectively use technology to improve student learning

Additional Constraints Submitted by the Summit Work Group

- There is a lack of evaluation of programs and practices.
- There is a lack of up-to-date resources, including trained technicians as well as hardware and software.
- The potential of health problems from computers and electronic devices is not resolved and is a potential constraint.
- Inadequate funding reflects a lack of state commitment to developing technology-rich learning environments for students.

7.3 Desired means of improving student learning with technology use

7.3.1 Vision for the desired means of improving student learning with technology use

The vision of the California public education system should be to produce:

- Lifelong learners who are able to use their reading, computing, writing, and oral communication skills to "make things happen";

- Strategic learners who are skilled in process and able to apply content and process to problem solving; and
- Community learners for whom the learning process expands beyond the two covers of a book, the four walls of a classroom and the six periods in a day.

Technology can assist the schools in meeting this goal when it enables and encourages active involvement in learning. Technology has a crucial and integral role in the fundamental learning processes of information gathering, collaboration, communication, information utilization, and self-assessment.

7.3.2 Specific actions, resources and funding needed to implement the vision

Actions required on a state-wide basis to implement a vision of lifelong, strategic and community learners assisted by technology include:

Support Issues

- Establish and/or enhance regional support agencies for technology.
- Provide on-site support for the operation and curricular use of technology.
- Establish legislation to require training for school board members and other stakeholders on technology integration.

Curriculum and Instruction Issues

- Require changes in the curriculum materials adoption process to enable statewide purchase of effective technology software.
- Change California's curriculum and instruction to exploit possibilities of technology.

Facilities Issues

- Provide adequate funding for reconstruction/remodeling of older California schools to support technology (e.g. wiring, reconfiguring learning spaces).

Access Issues

- Shift funding to guarantee one computer per student.
- Fund projects which provide access to electronic (voice, video, textual, etc.) information for students at school and at home.
- Form focus groups to collaborate with producers (hardware and software) to make technology more transparent.
- Establish/utilize telecommunications vehicles which support staff development, training, and teacher-to-teacher curricular connections. (This vehicle will provide at-will video, voice, data connections for all stakeholders)

Connection to the National Agenda

- Ensure exploitation of technology in California's response to the federal *Year 2000* plan. (The sense of this is the connection to other national and international technology initiatives.)

8.0 Partners in Learning

8.1 Present legislative mandate/intent related to creating partnerships in learning (AB 1470)

The California Planning Commission for Educational Technology shall develop a state master plan which forms a partnership between the public educational sector and the private business and industry sector to provide the best and most comprehensive education in the applications of technology for all students enrolled in public education institutions in this state.

8.2 Existing conditions and structures related to partnerships in learning

8.2.1 General Information

The following includes some of the major initiatives, programs, resources, and conditions concerning partnerships in learning.

- A report by the National Center for Education Statistics found that between 1983-84 and 1987-88 the number of public K-12 education partnerships rose from 42,200 to 140,800.
- Twenty-four percent of the nation's public school students benefit from education partnerships.
- Limited company/school partnerships for supporting experimental restructuring of schools exist (such as Apple, IBM, etc.).
- The California Academic Partnership Program (CAPP) provides early work experiences for at-risk students and grants to develop programs to assist the transition of students from K-12 to post-secondary education.
- The Industry Education Council (IEC) provides summer industry experiences for teachers.
- NASA, Lawrence Livermore Labs, and JPL provide staff development programs, summer internships for students, and multi-media resources to schools.
- Business and education foundations have been established by some school districts to allow them to accept donations from community resources.
- Some businesses have Adopt-a-School projects with schools.
- The Los Angeles Educational Partnership and the San Francisco Public Education Fund utilize funding from foundations and individuals to develop and implement innovative programs to meet the needs of educators and students – particularly underrepresented minorities.
- Technology for Results in Elementary Education (TREE) has been formed for the specific purpose of using corporate and other private sector resources to directly support the integration of technology into elementary education.
- The business/state education partnerships for creating new software include: Apple, Lucas Films, National Geographic, MECC, Jostens (all with the CDE) and IBM (with the CDE and CSU).
- Business coalitions exist that support educational technology legislation (AB 1470).
- Partnerships between K-12, higher education, and vendors have been formed to provide incentives for teachers to develop curriculum and software.

8.2.2 Funding for Programs and Projects

The following is a list of some current funding sources and conditions for programs and projects that are related to partnerships in learning.

- The California Business Roundtable has sponsored initiatives, such as SB 1274, which provided 6.8 million dollars of state money for restructuring grants to schools.

- Foundation and business grants to schools are available to fund a wide variety of educational technology projects in public and private schools.
- The IBM California Education Partnership provided approximately 20 million dollars to fund Staff Development Centers, a statewide network to 80 school districts, vocational training, and 50 joint Developmental Projects.
- Apple awards hardware and software to innovative teacher-developed projects that assist at risk K-12 students and funds schools with education partnerships so teachers can develop technology-based instructional units and lessons.

8.2.3 Issues and Constraints for the Existing Structure

The following are constraints and issues that have been cited as impediments to forming effective partnerships in learning.

- In the educational community there is a lack of awareness about partnership opportunities.
- Business does not always easily understand the complexity of public and private schools.
- Schools do not always know how to plan for the effective involvement of business resources.
- Often there is a lack of program evaluation for education/business/community partnerships.
- There is a lack of sufficient tax and business incentives to stimulate private sector involvement in education.
- Communication barriers exist between schools, community, and businesses that are difficult to break down.
- There is often a lack of common language, common goals and mutual trust and respect that results in unrealistic expectations.
- A lack of clearly defined goals, objectives, activities and evaluation can result in the loss of momentum and dissolution of resources.
- Poor or inflexible planning impedes progress and limits the ability to deal with unanticipated events.
- Final reviews of partnerships are needed to determine what has been achieved and to define new directions.
- Facilitators that understand the needs of both the educators and the prospective partners are needed in order to form plans that meet these needs.

8.3 Desired means of creating partnerships in learning with technology use between businesses, the community, and education

8.3.1 Vision of the desired means of creating partnerships in learning

The vision of the ideal means of creating partnerships in learning between businesses and education would include:

- Establish a variety of meaningful partnerships between business and education that have as a common goal the improvement of education through technological development and utilization.
- Partnerships should meet not only the needs of the learners, but also the underlying social and economic interests of those involved.

8.3.2 Specific actions, resources and funding needed to implement the vision

Actions to be taken to encourage partnerships must come from local, state level, corporate level, and university system level. State-wide or system-wide actions which may incorporate policy changes include:

- Support and encourage a variety of partnerships, including: business/education partnerships, K-12/higher education partnerships, and inter- and intra-segmental partnerships.
- Establish easy access to necessary information (e.g. through telecommunications networks, Education Partnership Week, California Education Partnership Consortium) to enhance development and dissemination.
- Create a resource guide to partnerships and partnership development including assessment tools.
- Create a distinguished business/education partnership program (i.e. state recognition of exemplary programs with identified liaisons for interested parties to contact.)
- Develop a manual/seminars on how to create partnerships. This will include case studies and scenarios of successful and unsuccessful partnerships.
- Assure that teacher education reform calls for the infusion of technology in all preservice education strands, across all curriculum levels for faculty and teachers/administrators in K-adult programs and institutions.
- Develop task force to involve developers and/or businesses who are not currently partnering with California schools to discuss resources and issues with materials development/state adoption requirements, etc.
- Solicit partnerships from America's corporations beyond those traditionally involved in education or educational products.
- Create legislation which provides financial incentives to businesses (both large and small) who donate cash or equipment to schools.

Additionally, when partnerships are established, the following actions can assist in their success:

- Prepare periodic progress reports and/or reviews (against goals and commitments as well as outcomes).
- Provide for teacher staff development and released time through university and industry providers.
- Take time to plan and plan carefully. Bring in others who may be interested in or be linked to that which you are contemplating. Agree on the need as well as the outcomes.
- Encourage self-reliance and in-house expertise (build an infrastructure of support networks within the educational institution and provide tools for problem solving (i.e. don't rely on the few to carry the project for the many).
- Strategize unique ways to share successes (i.e. teacher user groups, featured speaker series, parent aide training, distance learning, incentive programs, student aide programs/incentives, published chronicles, etc.).
- Document the process of implementation as well as the outcomes (monitor successes as well as failures and record solutions to problems).
- Encourage joint research and first hand observation of model technology programs.
- Recommend that partnerships secure a third party to conduct evaluation of the project and support the development of assessment tools.

9.0 Administrative Uses of Technology

9.1 Present legislative mandate/intent related to administrative uses of technology in schools (AB 1470)

The California Planning Commission for Educational Technology shall develop a state master plan which shows aggressive efforts to utilize technology to assist educational decision-makers at all levels. Reducing the duplication of effort, increasing access to existing data bases, and retrieving timely information must be goals to insure realistic use of technology by educational decision-makers. Technology should show capabilities in assisting in the day-to-day management of administrative tasks.

9.2 Existing conditions and structures related to administrative uses of technology

9.2.1 General Information

The following includes some of the major initiatives, programs, resources, and conditions related to administrative uses of technology.

- During the 1960's, through the Regional Center Plan, the state developed the California Educational Information System, a massive accounting and student-records software program.
- Governor Brown formed the Electronic Board on Intergovernmental Data Processing which created various consortia for sharing technology resources.
- Districts can select any of the three lowest "responsible" bidders for purchase of computer systems.
- The Management Information System (MIS) project (for community colleges) attempted to establish a standard informational data set that could be transported electronically throughout the state for better communication between campuses.
- The vast number of school districts throughout the state make autonomy difficult at the K-12 level.
- The current primary administrative use of technology in schools is for accounting and/or student records.
- Catholic schools have formed their own administrative networks for data exchanges, both locally and across the state, which includes training on how to use the system.
- Public schools must contract for services to assist in establishing technology-based management systems.
- Planning models do not exist for long-range technology planning and integration of technology policy and procedures into both curriculum and administrative regulations.
- The Office of Financial Management Practices and Standards provides resources and assistance to districts to establish computer-based management systems located in the California Department of Education.
- Most school districts use some form of automation of some administrative tasks.
- The cost-benefits of administrative uses of technology have not been clearly determined.

9.2.2 Funding for Current Programs and Projects

The following is a summary list of current funding sources and conditions for programs and projects that are related to administrative uses of technology.

- School districts utilize general fund dollars for administrative technology implementation and use.

- The state does not provide any funding that is earmarked specifically for administrative technology use.

9.2.3 Issues and Constraints for the Existing Structure

Following are constraints and issues that have been cited as impediments to developing administrative uses of technology.

- A need exists for a K-12 statewide information system that is connected to the State Department of Education.
- Administrative technology is often not cost-effective for small districts and private schools.
- Software is lacking for Management Information Systems (MIS) programs at the elementary schools.
- Reform is needed for technology purchasing procedures.
- Most districts do not have technology use plans that include administrative applications.
- Policies need to be created that outline vendor relations with public entities.
- Districts need objective advice on how to prepare hardware bids.
- A reasonable balance must be struck between mandates, standards, and local autonomy.

Additional Constraints Submitted by the Summit Work Group

- Models do not exist for long-range planning and the integration of technology policy and procedures into both curriculum and administrative regulations.
- Reform is needed for technology purchasing procedures. For example, districts frequently conduct "split bidding" to circumvent the usual bidding process.
- There is a lack of technology resource coordination between instruction and management in school districts.
- Funding is needed for legislated data collection mandates.

9.3 Desired administrative use of educational technology in schools

9.3.1 Vision of the ideal administrative use of educational technology

(This group modified the topic from "Administrative Uses of Technology" to "Instructional Support".)

The vision of the desired administrative use of educational technology is as follows:

- The role of instructional support is to facilitate lifelong learning through the use of appropriate technology.
- Technology should permit the interconnection and integration of students, teachers, and support staff to all relevant informational data bases and devices.
- The interconnection and integration of a variety of technology systems and devices is essential to make it usable and effective. Local technological autonomy must be balanced between functional demands and general (district, state, federal) standards.
- Technology must be universally and equitably accessible to all stakeholders (with appropriate controls).
- Technology must ensure that the data collected and stored is timely, accurate, and appropriately indexed and organized.
- The most critical aspect of technology is how it will be supported and maintained and how people will be trained to use it.

- Technology systems should be used to plan, monitor, and assess the effectiveness of the process and be utilized for the development of Individualized Learning Plans (ILPs).

9.3.3 Specific actions, resources and funding needed to implement the vision.

The following actions are recommended in order to implement the vision:

- Utilize networks to share data between all stakeholders.
- Collect information at the school site level.
- Allow for intradistrict exchange to facilitate information sharing.
- Provide access to a variety of stations and resources.
- Provide parents with access to information regarding homework.
- Organize information so as to enable its intelligent use and broad access.
- Ensure that access is equitable.
- Ensure that information accommodates the needs of diverse users.
- Create a system that is user friendly.
- Utilize appropriate, cost effective technology, driven by the job requirements.
- Provide access to instructional materials linked to the state curriculum frameworks.
- Enable teachers to confer electronically with the school board and other policy makers.
- Use ED U Card/Smart Card student ID codes.
- Make quality software available.
- Increase the size of the market for administration software so as to encourage vendors to develop better products.
- Make the training fit local requirements.
- Encourage administrators to use technology on a regular basis.
- Make sure that it is understood that the purpose is to support the instructional mission.
- Require all teachers and administrators to be competent at using the technology at a minimum level.
- Provide sufficient time and resources for implementation, support and maintenance.
- Develop ILPs to provide a record of individual performance for all students. ILPs will be aggregated to provide an indicator of success for students.
- Measure success based on outcomes not seat time (ADA funding).

10.0 Evaluation and Accountability

10.1 Present legislative mandate/intent related to evaluation and accountability of technology use in schools (AB 1470)

The California Planning Commission for Educational Technology shall develop a state master plan which makes recommendations for evaluation and accountability mechanisms for state-funded educational technology programs utilizing, among other data, information provided by the Superintendent of Public Instruction, the State Board of Education, and the Educational Technology Committee in the evaluation process defined in Section 5187.5.

10.2 Existing conditions and structures related to the evaluation and accountability of educational technology use in schools

10.2.1 General Information

The following includes some of the major initiatives, programs, resources, and conditions related to evaluation and accountability.

- School-Based Educational Technology Grant recipients are required to provide an evaluation of the impact of technology on instruction and student learning at their sites.
- The Comprehensive Education Technology Assessment Project (CETAP) is providing in-depth evaluations of the Instructional Television Agencies, the California Technology Project consortia, the Model Technology School projects, and 367 of the School-Based Educational Technology Projects.
- CETAP has developed sets of guidelines and templates to assist in present and future self-assessment and in-depth evaluations of the impact of educational technology projects and programs when they are implemented in schools.
- The Software and Video Clearinghouses provide for systematic evaluation of emerging educational software and video programs by teams of teacher-evaluators.
- An Educators' Guide for Evaluating Educational Technology Projects, combined with evaluation training by the California Technology Project consortia, has been employed to assist educators in evaluating their own School-Based Educational Technology Projects.
- Program Quality Review (PQR) and Western Association for School Creditation (WASC) procedures provide for teams of educators to periodically assess the quality and implementation level of school programs, including School Improvement Programs, School Development Programs, and School Based Coordinated Plans.

10.2.2 Funding for Programs and Projects

The following is a summary list of current funding sources and conditions for programs and projects that include evaluation and accountability.

- AB 1470 mandates and funds research/studies in the six Model Technology Schools (Level I) projects to determine the impact and educational benefits of a variety of technologies on student learning and teaching.
- AB 1470 provides $335,000 to CETAP for an in-depth evaluation of the 20 programs and projects funded by AB 803 from 1984 to 1989, as well as the major programs now funded by AB 1470 (MTS Level I and II, CTP, ITV Agencies, and 367 School-Based Grants). This study will provide findings and recommendations that will be submitted to the California Planning Commission for Educational Technology for consideration when developing the final California Educational Technology Master Plan.

- AB 1470 will provide over one million dollars to fund R & D projects that address the needs of limited and non-English speaking students to K-12 sites and institutions of higher education.
- The Alternative Assessment Project, funded by AB 40 (Quackenbush), will provide opportunities to apply technology to the development and validation of performance-based authentic assessment procedures.

10.2.3 Issues and Constraints for the Existing Structure

The following are constraints and issues that have been cited as impediments to effective evaluation and accountability.

- Past efforts to implement and use technology in education have largely been unevaluated.
- Evaluation has not been perceived as a high priority for previous educational technology programs.
- Policy makers and evaluators sometimes apply traditional evaluation methods to programs and get results that do not account for the reported benefits of technology.
- Legislators want to know if the investment of state money in educational technology is producing cost-effective outcomes for students.
- Appropriate methods for assessing educational technology programs are often missing in evaluation studies.
- Evaluators often ask the wrong questions when attempting to evaluate the effects of technology.
- Technology is often treated as something separate from the instructional program when considered for evaluation.
- Sometimes a lack of evaluation findings for technology is used as justification for eliminating funding to important technology programs.
- Teachers often do not appreciate the need to conduct evaluations of technology interventions or other innovations in education.
- Software is often perceived as having been validated because it has received recommendations from a publisher.
- Publishers often do not want to invest in evaluations to determine the long-term effects of their products.
- The Program Evaluation and Research Department of the California Department of Education should play a role in the evaluation of educational technology and other programs.
- Technology resource evaluation should be done as part of the evaluation of all other instructional materials.
- There is inadequate evaluation and assessment data regarding implementation, use, or effects of educational technology in schools.

Additional Constraints Submitted by the Summit Work Group

- Expectations are often a moving target and therefore difficult to assess.
- No centralized data bank of research findings and evaluation results exists.
- There are misconceptions about technology and evaluation. Technology should not be evaluated as a stand-alone program. Rather, its impact within the context of the overall school program needs to be addressed.
- There is a lack of communication and involvement among stakeholders.
- Traditional evaluation techniques may be inappropriate for certain projects and may not capture the less tangible benefits.

- There is a lack of time and support for the planning process.
- Some evaluation strategies may interfere with the project itself.
- Evaluation has a negative connotation.
- Political agendas often taint evaluation design and use.

10.3 Desired means of evaluating and assessing the use of educational technology in schools

10.3.1 Vision of the desired structure for evaluation and assessment

Quality evaluation matches outcomes against established criteria and helps to determine whether a program has achieved its goals. It is a process that has the following characteristics:

- It integrates with the project's planning/design process. It may be based on research methods and findings.
- It considers the needs of all stakeholders in design, implementation, and dissemination.
- It consists of mutually defined and agreed upon strategies that are appropriate to the individual project.
- It produces readily shared and easily accessible information.
- It provides information during and at the end of the project.
- It acknowledges both potential short- and long-term outcomes.
- It ensures accountability.

In order to best serve students and educators in California, evaluation examines technology as it fits into the entire context of the educational process.

10.3.3 Specific actions, resources and funding needed to implement the vision.

The evaluation work group recommends the following actions:

- Establish a stakeholder team process, involving both local project teams and a state level team, to ensure ongoing feedback. Resources to accomplish this include: California Department of Education, county and district offices of education, IHEs, California Technology Project, California Instructional Video Consortium, private industry, and associations such as Evaluation Research Society, AERA, and CERA. This could be funded by state and project budgets.
- Create an electronically accessible clearinghouse for global sharing of basic research findings and project evaluation results. Resources to accomplish this include: National Diffusion Network, ERIC, Internet, Software and Video Clearinghouses, Dialog, and TERC. This could be funded by state and project budgets, membership fees, partnerships, and foundations.
- Develop a California Educational Technology Evaluation Project to serve as a resource to practitioners and to provide training as needed. This project could be modeled after the California Subject Matter projects and funded by membership fees, state fees, and/or service fees.
- Establish a research advisory committee to develop an annual research plan for state-supported projects and compile common results from the previous year's evaluation activities. Resources to accomplish this include: California Department of Education, county and district offices of education, IHEs, California Technology Project, California Instructional Video Consortium, private industry, and associations such as Evaluation Research Society, AERA, and CERA. This could be funded by the state budget.

Panel Members

Don Ely, Summit Facilitator, has been a professor at Syracuse University for the past 35 years. He also serves as a trustee to the county library system and will be a delegate to the White House Conference on Libraries and Information Services next July. These activities relate to his administrative assignment with the ERIC Clearinghouse on Information Resources. Recently, the State of New Mexico has asked Ely to assist in the development of a state-wide educational technology plan.

Panel 1: State of the State

Delaine Eastin is currently serving her third term in the California Assembly. In her second legislative term, she authored some major education measures and received an award from the Alcosta Chapter of the California Teacher's Association. In 1990, she was appointed Chair of the Assembly's K-12 Education Committee. Before her election to the Assembly, she worked as a community college professor and corporate planner and served two terms as a Union City Council Member.

Sam Farr, currently serving his fifth term in the California Assembly, is Chair of the Assembly Committee on Local Government. In addition he serves as Vice-Chair of the Joint Committees on International Trade, the Arts, and Science and Technology, and is also a member of the Standing Committees on Education, Higher Education, and Natural Resources. During his nine years in the State Legislature, Farr has consistently sponsored significant legislation for education excellence, economic development, and environmental protection. He was a co-author of AB 1470, the Farr-Morgan-Quackenbush Educational Technology Act of 1989.

Bill Honig, State Superintendent of Public Instruction, is a nationally recognized advocate of excellence in education. During his first term, he worked closely with the Legislature on Senate Bill 813, the Hughes-Hart Educational Reform Act of 1983. Together with other educational leaders he authored Proposition 98 which provides a stable funding base for education. Under his leadership, the educational community has implemented a stronger core curriculum based on state curriculum frameworks, supported the development of improved instructional materials, and instituted new accountability systems. Honig's book, *Last Chance for Our Children*, is his blueprint for improving California schools. He has received numerous awards and recognition for his outstanding achievements.

Becky Morgan, currently serving her second term as state Senator from the 11th District, is Vice-Chair of the Education Committee and Chair of the Select Committee on Child Care and Development. She is a member of the committees on Budget and Fiscal review, Transportation, Revenue and Taxation, Energy and Public Utilities, the Joint Committee on Science and Technology, and the Select Committee on Substance Abuse. Morgan's leadership and skills in the Senate have resulted in her being named Legislator of the Year. Her commitment to education is a long standing one, having served both as a teacher and a member of the Palo Alto Board of Education. She was a co-author of the Farr-Morgan-Quackenbush Educational Technology Act of 1989 (AB 1470).

Charles Quackenbush, currently serving his third term in the California Assembly, is a member of Assembly Committees on Ways and Means, Banking, Natural Resources, Elections, Reapportionment, and Constitutional Amendments. As an advocate of educational reform and innovation, he has co-authored legislation to bring educational technology to the classroom (AB 1470) and to bring local control and parental empowerment to schools.

Panel 2: State of Education

James Baughman is Superintendent of the San Jose Unified School District. Prior to his current position, Baughman has served as a teacher, high school principal, and district office administrator. Under his leadership, San Jose Unified has established a new process for teacher negotiations; has adopted and is currently implementing a comprehensive, integrated Technology Plan; has established a community involvement and long-range planning process which links business, government, and education; has established five pilot programs for locating community services on school sites as well as providing an overhaul of instructional programs at the schools; and has established administrative restructuring based upon "high performance teams" and "cluster teams."

Craig G. Blurton is an Associate Professor at California State University, San Bernardino. In 1989-90, he was awarded a $2.8 million grant from the California Department of Education to establish and direct the California Technology Project. He is a member of the California Post-secondary Commission's Policy Task Force on Educational Technology, and has received the "Golden Disc" award for significant contributions to educational technology from the California Computer-Using Educators Association.

Ernest Leach is Vice Chancellor for Economic Development and Vocational education for the California Community Colleges. Leach has served as a Marketing Management Consultant with special emphasis on economic development, student recruitment and student retention for more than 100 colleges in the United States and Canada. His publications on marketing and management have appeared in the *Community and Junior College Journal*, the *NASPA Journal*, and a professional higher education newsletter. He has been a member of national education advisory committees. He is a frequent presenter at national marketing workshops for colleges and universities.

Tom Mossman has thirty years experience as a public broadcaster and educator. He has served as Station Manager, Production Manager, and Producer-Director of hundreds of television programs. He has multi-disciplinary experience which includes assisting in the start-up of two television stations. As Director, Department of Telecommunications Services, Archdiocese of Los Angeles, Tom Mossman is charged with the responsibility of expanding the use of television to serve the needs of the Archdiocese through the production of informational, inspirational and educational programs and teleconferences. He also serves as Chairperson of the Regional Education Television Advisory Council's Executive Committee; and Founder and Chairperson of the Board of LATV. LATV is a nonprofit corporation dedicated to the development of public and educational cable access in the city of Los Angeles.

Barbara O'Connor, Professor of Communications at California State University at Sacramento, is currently the Director of both the Institute for the Study of Politics and the Media Center for California Studies. O'Connor's experience and expertise where decisions are made spans diverse areas, such as, public communication strategies, telecommunication planning, technological innovation, broadcasting, market research, public opinion formation, and organizational development. She serves as the chairperson of the California Educational Technology Committee and Chairperson of the California Public Broadcasting Commission.

Elizabeth Stage is the Executive Director of the California Science Project, one of six subject matter staff development projects administrated by the University of California on behalf of California teachers. As the Lawrence Hall of Science's Director of Mathematics and Computer Education, Stage helped to write the 1985 Mathematics Technology in the Curriculum Guide, and co-directed the Mathematics and Science Technology Institute for two years. More recently, she chaired the Science Framework Committee and is currently Chair of Curriculum Commission, an advisory body to the State Board of Education.

Panel 3: State of the Art

Stewart Alsop has been involved in the personal computer industry since 1981. He is editor and publisher of "The Insider's Guide to the Personal Computer Industry", a newsletter for personal computer industry and information executives, which is published every three weeks. He is also the president of Industry Publishing Company, Inc., a wholly owned subsidiary of the International Data Group. Most recently, Alsop founded the Foundation for Educational Software, headquartered in Redwood City, CA.

William D. Gattis is President of TechByte International, Inc., a developer of educational software systems based in Montreal, Quebec, with offices in Arlington, TX. In addition to several currently marketed educational software products, TechByte is engaged in developing a solution to the challenging problem of software compatibility, with a focus specifically on the education markets in North America and Western Europe. Prior to joining TechByte in 1989, Gattis was Vice President of the Tandy Corporation/Radio Shack Education Division.

Jere Jacobs, Assistant Vice President, Pacific Telesis Group, serves as an assistant to Sam Ginn, Chairman and Chief Executive Officer of the corporation. With over 20 years experience in many facets of the telecommunications industry, Jacobs is currently deputy chairman of the California Business Roundtable's Education Task Force. In 1985 he was appointed to serve as a congressional staff assistant to the Energy and Commerce Committee of the U.S. House of Representatives.

Christine Maxwell is senior Vice President, Maxwell Macmillian Publishing Corporation, whose offices are based in Berkeley, CA. The company is currently exploring opportunities for multimedia education applications for school and consumer markets. Maxwell is an expert in ESL programs for education and serves on the Board of Directors for the San Francisco Volunteers program.

Joseph H. Oakey is a Distinguished Fellow at Autodesk, Inc., where he has made a professional contribution for six of the organization's eight years. For five of those years, Oakey was a member of Autodesk's Education Department. He currently serves as a member of a statewide Advisory Committee for Evaluation and Research (Chancellor's Office, California Community Colleges) and as a member of the Advisory Council of the National Technology Student Association. As an educator, Oakey has served as a consultant to many agencies and organizations, including General Electric, Eastman Kodak, and Encyclopedia Britannica, and he has served on the White House Committee for National Goals for Education.

David Thornburg is the director of the Thornburg Center for Professional Development. Through his center, he conducts research and provides staff development in the areas of multimedia and whole mind education throughout North America. He is a futurist devoted to reconnecting the cognitive and affective domains in order to help students become proactive lifelong learners. He is currently exploring ways that media like CD-ROM's will change the face of education, both at home and in the classroom. He serves on the boards of the Children's Discovery Museum of San Jose, the National Council for Self-Esteem, the Center for Self-Esteem, the advisory board of the Monterey Model Technology Schools Project, and the Citizen's Action Committee of Redwood City.

Summit Participants

1. Governance and Legislative Authorization

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2. Critical Problems and the Role of Technology

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9. Administrative Uses of Technology

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Appendices

Press Release

EDUCATIONAL TECHNOLOGY IN CALIFORNIA SCHOOLS

SACRAMENTO --- State Superintendent of Public Instruction Bill Honig will discuss plans to ensure California's position as a leader in educational technology during his keynote address at the California Educational Technology Summit. He will talk about current use and accessibility of technology contrasted with his vision for the future of technology as a means to improve curriculum and instruction in California.

Following this overview, Honig will join Senator Rebecca Morgan, and Assembly Members Delaine Eastin, Charles Quackenbush and Sam Farr in a panel discussion about present and future issues in education and ways that technology can support education.

DATE:	Thursday, April 25, 1991
TIME:	8:00 a.m. Welcome and Introductions
	8:30 - 8:40 a.m. Honig's Remarks
	8:40 - 9:30 a.m. "State of the State" Panel Discussion
PLACE:	Clarion Hotel, Terrace Room
	700 - 16th Street, Sacramento

For the past several years, the use of educational technology in California's schools has expanded rapidly. This expansion has taken many directions, including telecommunications, distance learning, the use of computers to enhance the curriculum, interactive multimedia, instructional television, telesatellite instruction, staff development, and others. Since 1984 California has invested approximately $119 million in over 30 major programs to promote the use of educational technology in the schools.

AB 1470 established the California Planning Commission for Educational Technology to develop a long-range plan for educational technology. This two day conference, April 25-26, will bring together all components of the educational system, business and industry, and the legislature to address both the existing and the desired applications of technology in California education. The summit will serve to increase awareness of technology and its limits and potential; provide for a dialogue about important technology-related issues across educational sectors; and produce specific recommendations to assist the Commission in the development of the California Educational Technology Master Plan. Over 150 participants will be working in small groups to develop recommendations.

For more information on the summit, please contact John Cradler, chair of the planning committee, at (415) 565-3018.

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Themes from the Work Group Reports

By Don Ely, Summit Facilitator

Each of the work group reports, by themselves, is more comprehensive than any summary might be. What follows is one person's perception of the themes emanating from the oral reports. It was given immediately at the close of the reports and therefor lacks elaboration.

In general:

- The full spectrum of formal education was included (both K-12 and post-secondary).
- Technology was considered primarily as a means, a tool to improve teaching and learning.
- Several references were made to communication beyond the state and the nation – to international settings.
- There was recognition of the time required to implement technology in education.

Every group mentioned the requirement of an information/communication system that would make available multiple resources, in all media formats, to a wide range of users across the state. Some called this system a database; others emphasized the connection or networking aspects.

Closely allied to such a system was unanimous endorsement of access, both intellectual and physical, to information resources. References to "highways," "pathways" and "gateways" seemed to imply user friendly access and switching capability to lead users to the best sources among those available. Use of access systems for education should be recognized by arranging favorable communication rates (even if a legislative mandate is required). Equity of access was mentioned by several groups. Some groups felt that present highways could be used as a base for new and expanded efforts; others felt that new "super" networks would be required.

The need for collaboration at all levels was underscored by many groups. The organization of new consortia to be added to those that already exist should be encouraged. Such consortia are natural dissemination points for entire regions. Business and industry partnerships should continue and expand; they should be integral elements of a state plan.

Staff development as part of the Master Plan for Educational Technology is essential. The acquisition of technology is pointless unless staff have gained the knowledge and skills to properly use the media in teaching and learning contexts. Staff development efforts should be focused on local school sites; it should include all potential parties (including school boards!). It was referred to as the "glue" that holds together the parts that make technology work in classrooms.

The learner was not forgotten in the process. Concerns for diverse populations and varied learning styles should require flexibility in the design and use of software – quality software that meets curricular standards (that must be established).

Integration of technology within the curriculum is seen as essential and consideration should be given to the creation of individual learning plans (ILPs). Efforts in developing user-friendly software should be based on student needs.

There was a lower frequency of mention among several items. They may not be less important; rather not recognized by all of the groups. These items included:

- Standards for new and renovated buildings for the use of technology should be developed.
- Technology should be more transparent with standards for its use (in networking) and in its compatibility.
- The funds needed to accomplish many of these objectives can come, in part, from reallocation of existing funds.
- Evaluation should be built-in at the beginning, middle and end of every project. It should be based on shared information use for decision-making.
- There is no substitute for strategic planning on a statewide scale.
- A bold suggestion to create a private, non-profit agency to administer educational technology in the state was proposed. Suggestions for its representative board, functions, and marketing strategy were made.

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Appendix C

High-tech

Summit focuses on Technology Master Plan development

SACRAMENTO — Leaders in California's high-tech business community joined teachers, professors and school administrators on April 25 in the state's first Educational Technology Summit Conference in Sacramento.

The purpose of the landmark gathering was to formulate the basic elements of a Technology Master Plan for California Education.

The two-day meeting was convened by the California Planning Commission for Educational Technology, the technology panel created in 1989 by AB 1470 (The Educational Technology Act). The Commission is charged with developing a state master plan for technology use in schools by 1993. The summit was endorsed and spon-

Continued on page 2

Summit focuses on education technology

Continued from page 1

sored by numerous corporations and educational organizations, including ACSA.

Several ACSA members were among the 165 conference delegates, including ACSA President-Elect Charles Binderup.

"The Summit helped focus our attention on the imperative to begin considering non-traditional delivery systems to enhance classroom instruction," Binderup said.

"California should be in the forefront in applying technology to solve many of our educational problems. Unfortunately, we are not. An effective state master plan, with buy-in from all parties, is essential."

The summit was chaired by ACSA member John Cradler, a former school administrator who works for Far West Laboratory.

Conference participants heard from legislators and a panel of industry experts on the status and prospects of educational technology.

State Superintendent of Public Instruction Bill Honig told the group that technology is an important resource to support the state's more demanding curriculum. "Technology is one of the important tools to help us achieve the curriculum reform mission," Honig said.

After meeting in working groups for two days, summit participants produced important recommendations that will provide the groundwork for the educational technology master plan.

Among the many ideas discussed by the nine working groups were calls for greater coordination and articulation between K-12 and higher education, increased staff development and site-based support to implement technology, and expansion of technology-supported curriculum materials and instructional delivery systems.

"In general, summit recommendations emphasize technology as a means to accomplish broad educational goals," said Cradler.

Cradler said those goals included coordination and access to learning resources, improved collaboration and communications, expansion of the curriculum, effective staff development and increased access to effective technology.

Specifically, the groups called for:

- Providing a statewide database of learning resources using voice, data and video that is available to all educators and students in the state.
- Networking or linking the myriad electronic communications networks together.
- Establishing standards for school facilities that will accommodate new technologies.
- Continuing to include long-range planning requirements in future legislation.
- Establishing a legislative mandate for the PUC to provide special rates to education agencies for telecommunications systems.

The recommendations from the summit have now been forwarded to the Technology Commission and will be merged with the results of California Educational Technology Evaluation Project conducted by Far West Labs and input from schools involved in the California Technology Project regional consortia.

For more information regarding the final proceedings and use of the videotape of the summit, contact John Cradler at Far West Laboratory, (415) 565-3018.

SUMMIT SPONSORS

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SUMMER 1991

FarWest focus
New Ideas for Today's Schools

Master Plan Will Map Vision for Educational Technology

What should be the role of technology in education? Is it a vehicle for educational reform? These questions were at the heart of an educational technology summit held in April in Sacramento, convened by the California Planning Commission for Educational Technology and sponsored by a host of high tech businesses and education organizations including Far West Laboratory (FWL).

For two days, some 165 teachers, professors, school administrators, and business people — joined by state Superintendent Bill Honig and several key legislators — focused on producing recommendations for California's educational technology master plan being developed by the Commission under AB1470. Emphasis was placed on creating a vision — ideas and solutions to guide the future — rather than on ways to find more dollars.

After extensive work-group discussion of the issues, summit recommendations covered a spectrum of concerns. A main theme was *coordination* of the many existing electronic communication networks and resources to avoid duplication and promote more efficient use. Another was better *access* — for all educators and students in California to all learning resources, whether they be voice, data or video. A third was improved *collaboration and communication*, via such mechanisms as an educational electronic information dissemination network and business/education partnerships. Participants also urged using technology to *expand curriculum*; giving priority to short- and long-term *strategic planning*; and ensuring adequate *staff development*. Facilitator Don Ely, a nationally recognized educational technology leader, stressed that technology should not be an adjunct, but a problem- solving tool used in all aspects of education.

Conference proceedings will be combined with other sources of information such as the results of the California Educational Technology Evaluation Project being conducted by FWL in creating the technology master plan. The Commission also welcomes input from interested educators.

For final conference proceedings or use of the summit video tape, contact John Cradler, summit chair, at FWL, (415) 565-3018.